

REMARKS

Re: The Kasahara Reference in View of the DVD Disc Rejection (paragraph 8 of the Office Action dated November 8, 2005)

Paragraph 8 of the Office Action reads as follows:

- "8. Claims 1-8, 12, 15-18, 22-25, and 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasahara et al (US 4,034,506) in view of DVD disc "Lectro Engineering Company, MTM Systems" substantially as set forth in the 04/26/2005 Office Action. The art rejections have been maintained for the following reasons. As admitted by Applicant, Kasahara teaches every limitation as required by claim 1 except the hardness of the adhesive (as shown in table 1 of the 08/15/2005 amendment). The examiner disagrees. Applicant's attention is directed to column 9, lines 35-37. Kasahara discloses a liquid adhesive having a viscosity of about 50 to 7000 cps, which falls within the range disclosed in the present specification (page 15, lines 15-20). It appears that the hardness of the adhesive after curing and its viscosity are correlated. Therefore, it is not seen that the hardness of the adhesive of Kasahara could have been outside the claimed range as its viscosity is within the claims range." (emphasis added)

First, Applicant would like to say a few things with respect to the underlined portions of the above-quoted paragraph. Applicant's attorney is of the opinion that the first underlined sentence somewhat "oversteps" the words and spirit of what was actually said in Applicant's response to the last Office Action. For example, the previous response's explanation of Table 1 (page 12, lines 25-28) contains the following statement:

"The individual information blocks contained in the resulting matrix have three different kinds of entries. An information block with a check mark (✓) indicates that Applicant assumes for the sake of argument that the concept associated with the appropriate claim 1 element is taught or reasonably suggested in the cited reference." (emphasis added)

Such assumptions were necessary in order to create Table 1. Plain and simple, there just is not enough room in the blocks of Table 1 to make detailed distinctions. Table 1 was created to graphically or visually depict that, even with the most "generous assumed for the sake of argument" assumptions, no combination of the references teaches the present invention. Apparently, Applicant's graphic endeavors have failed to impress the Examiner. Be that as it may, when not confined to the space limitations of those blocks, Applicant discussed the teachings and import of the Kasahara reference in the following terms:

Re: U.S. Patent 4,034,506

"8. U.S. Patent 4,034,506 to Kasahara ("the '506 patent") does not teach or suggest electrical excitation zone treatment of its beads. It does, however, teach adhesive coating such beads. Moreover, the reference also teaches the use of beads having 2-20 mm diameters which partially fall within Applicant's bead diameter range. The '506 patent does not, however, teach or suggest coating its beads to an extent such that at least 50% of such beads are at least 50% adhesive coated. Likewise, the '506 patent in no way teaches or suggests use of adhesives having cured hardness levels of Shore A-20 to Shore A-95. Applicant does, however, concede for the sake of argument, that the '506 patent teaches an adhesive weight percentage that at least partially falls within Applicant's "Adhesive 20-80 wt. % of Product" limitation. Finally, even though the '506 patent's "foamed" products will no doubt contain some void volume, nothing contained in the '506 patent teaches that such a void volume will fall within Applicant's 10-40% void volume limitation.

And here again, even if one combines (under 35 U.S.C. § 103) the electrical excitation of particles used in making composite materials taught by the DVD with the teachings of the '506 patent to Kasahara, one is still left with a resulting material that may not have (1) at least 50% of its beads, at least 50% coated, (2) a 20-80 wt. % adhesive component and/or (3) an adhesive having a Shore hardness in Applicant's A-20 to -95 range. In short, the resulting materials are not, or are not necessarily, the "identical chemical compositions" such as those discussed in the In re Spada reference that was cited by the Examiner with respect to the Kasahara patent."

Therefore, Applicant is of the opinion that the Examiner's statement: "As admitted by Applicant, Kasahara teaches every limitation as required by claim 1 except the hardness of the adhesive (as shown in Table 1 of the 08/15/2005 amendment)" transcends what was actually said.

Applicant also is of the opinion, that the second underlined sentence constitutes Examiner "overreaching" of another variety. The second underlined sentence reads as follows:

"It appears that the hardness of the adhesive after curing and its viscosity are correlated."

With respect to this second underlined sentence, Applicant would respectfully respond with a rhetorical question: What substantive evidence of record supports the asserted correlation between an adhesive's viscosity and its hardness?

In fact, there is no evidence of record that would in any way support an assertion that an adhesive's viscosity determines its hardness. Perforce, there is no evidence of record

teaching or in any way suggesting that a given viscosity produces a cured adhesive hardness level of about Shore A20 to about Shore A95.

Even further removed from the evidence of record is a reference or combination of references that teach or suggest a composite material having all of the following underlined attributes:

"Claim 1 (original): A composite material comprised of a plurality of electrical excitation zone-treated, adhesive coated beads having average diameters between about 1 and about 10 mm and of which at least 50 percent are at least 50 percent coated with an adhesive and wherein a cured form of said adhesive has a hardness ranging from about Shore A 20 to about Shore A 95 and is used in a quantity such that it represents between about 20 and about 80 weight percent of the composite material and thereby serving to create a system of void spaces that constitutes from about 10 to about 40 volume percent the total volume of said composite material."

The Examiner then states that: "Therefore, it is not seen that the hardness of the adhesive of Kasahara could have been outside the claimed range as its viscosity is within the claimed range." To this, Applicant would respectfully reply, that contrary to the Examiner's assertion, it is very easy to see how the hardness of the adhesive could be outside the claimed range. The answer to this "how" question is simple - formulate the ingredients of the adhesive to produce a cured adhesive hardness outside that range.

Once again, Applicant would direct the Examiner's attention to the first paragraph on page 67 of the present patent application. It reads as follows:

"Applicant's experimental findings have established that, when used in the hereindescribed proportions (20-80 wt. % or 2-5 vol. %), certain adhesives (those having hardness levels ranging from about Shore A 20 to Shore A 95) play an important part in the ability of the hereindisclosed bead/adhesive/void space padding materials to repeatedly absorb high levels of impact energy. This finding was primarily established through use of various impact tests. For example, in series of such impact tests (so-called Acceleration Peak (G) tests) whose results are shown below as Test 1 below, Applicant kept the percent of adhesive constant at 2 volume percent and varied the "hardness" of the adhesive. This variation in hardness was accomplished by increasing the number of chemically active sites of the adhesives by adding varying amounts of a second chemically active component to a base resin system. For example in polyurethane formulations, the relative amount of N=C=O component of the adhesive was varied relative to a NH-C-NH component of said adhesive. Such tests indicated that as the hardness of the adhesive material used to create the subject bead/adhesive/void space materials of this patent disclosure was increased, the material's impact absorptive ability increased as well. These

tests also indicated that the adhesive itself (and not just the beads) contributes greatly to the impact absorption qualities of Applicant's padding materials."

The above quoted language, and the underlying data further supporting that language, clearly show that, under the teachings of the present invention, the same type of adhesive material, e.g., polyurethane, can have different Shore hardness values according to how that adhesive's original ingredients were formulated. In other words, the above language teaches that some polyurethane adhesives can cure to hardness values falling within Applicant's Shore A-20 to Shore A-95 range - while other polyurethane adhesives can cure to hardness values outside of Applicant's Shore A-20 to Shore A-95 range. Thus, the '965 patent application clearly shows, by way of example only, that two urethane-based adhesives can have different hardness levels. Moreover, Applicant has clearly demonstrated that these different hardness levels can be used to achieve different results (e.g., the ability to repeatedly absorb high levels of impact energy) in Applicant's final products according to whether or not such urethane-based adhesives were specifically formulated to have cured adhesive hardness values ranging between Shore A-20 and Shore A-95. In short, the above paragraph teaches a way of creating different hardness levels in a polyurethane. More specifically, it teaches that a polyurethane's hardness can be varied by changing the relative amounts of its N=C=O and NH-C-NH ingredients.

Applicant also would respectfully call the Examiner's attention to the fact that nothing whatsoever is said in the above paragraph about varying the viscosity of the polyurethane or its precursor ingredients in order to vary the hardness of the cured adhesive. Moreover, nothing in the prior art or the present patent disclosure correlates viscosity with hardness. This concept is pure speculation on the part of the Examiner.

9. Re: Dependent Claims 9-11, 13 and 20

These claims have been rejected because the Examiner is of the opinion that it is "obvious" to combine the glass or clay hollow beads of Shannon with the polyethylene beads of Kasahara. Here Applicant would first note that the cited patent references are concerned with floating, hydroponic gardening materials. Applicant's problem is that he fails to see a compelling nexus between bead/adhesive materials used in the hydroponic gardening context of the cited references vis-à-vis Applicant's bead/adhesive materials used for their

impact absorbing properties. Be that as it may, it would appear to Applicant that the only reasonable nexus in play here is that both materials are bead/adhesive materials. Thus, the question becomes, are the materials of the cited references "the same" and therefore supportive of the Examiner's "inherency" arguments, or are Applicant's materials "obvious" variations of the cited references under 35 U.S.C. § 103? Applicant is of the opinion that neither conclusion is appropriate. That is to say that, for all the reasons stated above with respect to the Kasahara reference standing alone, Applicant is of the opinion that the two bead/adhesive materials are not the same - whether or not the beads are solid (a la Kasahara) or hollow (a la Shannon).

Re: Claims 14 and 26

The Examiner has asserted that it is obvious "to substitute the thermosetting material for the thermoplastic material to form the beads because two foam materials have been shown in the art to be recognized equivalent materials for use in the hydroponic cultivation and growth of plants." Applicant must respectfully take issue with this statement on several grounds. First of all, the terms "thermosetting" and "thermoplastic" have well recognized distinctive meanings. At page 63, lines 10-20 of the patent application, Applicant makes the following statement:

"Plastics and resins are preferred for making elastic and/or hollow beads that can be used in Applicant's padding materials. Such plastics are generally made from resins through the application of heat, pressure, or both. Such resin materials generally fall into two broad categories: (1) *thermoplastic resins*, which can be heated and softened innumerable times without suffering any basic alteration in characteristics; and (2) *thermosetting resins*, which, once set at a temperature critical to a given material, cannot be resoftened and reworked. Thermoplastic resins and thermosetting resins have the advantage of readily accepting corona, flame, plasma jet and etching treatments." (emphasis added)

Thus, Applicant is of the opinion that, to a large degree, these two terms should be considered antinomic - or nearly so. The Condensed Chemical Dictionary, Tenth Edition published by Van Nostrand Reinhold Co. supports Applicant's interpretation. It defines the term "thermoplastic" as "a high polymer that softens when exposed to heat and returns to its original condition when cooled to room temperature." It defines the term "thermoset" as "a high polymer that solidifies or 'sets' irreversible when heated."

This distinction will remain no matter what the beads are used for. In other words, Applicant is of the opinion that the distinctions between these words will remain whether or not beads made from these distinctly different materials are used to make floating foam materials for hydroponic cultivation (a la Schwab) or are used to make impact resistant materials (a la Applicant).

In other words, it seems to Applicant that, whether or not either kind of material has been used to make beads that will replace (or augment) Kasahara's beads is of little or no value to Examiner's argument. That is to say that whether or not Kasahara/Schwab's beads are used in a far a field application such as hydroponic cultivation (or for that matter, even if one assumes for the sake of argument that the Kasahara/Schwab beads [thermosetting or thermoplastic], were used in a context of impact resistance) one would still be faced with the fact that the resulting composite would not have the previously underlined attributes of claim 1 - or that these attributes should not be considered "obvious" under any technically valid view of the scope of the teachings of the prior art.

Be that as it may, Applicant will rely on his previous arguments as to why the Kasahara reference does not meet the "obvious" requirements of 35 U.S.C. § 103, and then add that the teachings of the Schwab reference in no way cures the faults of the Kasahara reference relative to the teachings of (and claims to) Applicant's invention.

Re: Claims 19 and 21

Applicant respectfully submits that the claiming scheme and prosecution of these claims of this patent application are such that the teachings of the Kasahara reference, vis-à-vis claim 1, will determine its fate. In other words, Applicant is of the opinion that adding the Tully et al. teachings to the Kasahara reference will not cure the faults of the Kasahara reference with respect to the details of Applicant's particular invention as delineated in claim 1.

Re: Claims 1-8, 12, 13-20 and 22-33

To begin this discussion, Applicant would note that the Examiner has conceded that: "Bainbridge is silent as to the amount of the adhesive being used to fuse the beads together." Certain very relevant points must follow from this. They include:

(1) If the amount of adhesive is not known, one does not know if at least 50% of the beads are at least 50% adhesive covered. Again, this requirement is a limitation found in claim 1.

(2) If the amount of adhesive is not known, one does not know if the adhesive represents 20-80 weight percent of the final product. This requirement is also a limitation found in claim 1.

In response to this the Examiner asserts the following:

"Since the porosity is essentially regulated by the bead size and the amount of the adhesive being used to held the beads together. Therefore, it is the examiner's position that the amount of the adhesive would be inherently present within the claimed range so as to enable the composite material to have the porosity within the claimed range."

Applicant respectfully submits that the above statement to the effect that "porosity is essentially regulated by bead size and the amount of adhesive being used" is an unsupported assertion on the part of the Examiner. In effect it assumes that no other factors could be in play with respect to the subject of the material's "porosity."

For example, the porosity, with respect to the passage of air or moisture through the composite material may be affected by the type of adhesive being used and/or the hardness of that adhesive. In other words, some adhesives may have a greater affinity for air or water. Applicant does not "know" (e.g., have data, experience, etc.) that this is the case, but respectfully submits that neither does the Examiner "know" that no other factors (e.g., type of adhesive) are involved in the concept of porosity with respect to air or moisture.

Re: The Carlson Reference (U.S. Patent No. 5,849,864)

The Examiner makes the following comments concerning the Carlson reference:

"Bainbridge does not specifically disclose the hardness of the adhesive. Carlson, however, teaches a polyurethane adhesive possessing long shelflife, extended pot life and curing rapidly on demand (column 1, lines 43-46). Carlson teaches the polyurethane adhesive made from Rubinate 9272, which is exactly the same adhesive used by Applicants. Therefore, it is not seen that the adhesive of Bainbridge as modified by Carlson would have a hardness after curing outside the claimed range as the same adhesive material and the same amount of the adhesive are employed. This is in line with In re Spada, 15 USPQ 2d 1655 (1990) which holds that products of identical chemical composition can not have mutually exclusive properties. Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to use the adhesive as taught by Carlson to fuse the beads together because the adhesive can be used to join the plastic beads together, having long shelf life, extended pot life and curing rapidly on demand.

To this assertion, Applicant would respectfully respond as follows:

The Carlson reference teaches an adhesive formulation comprised of (1) a polyol or polymercaptop resin, (2) a polyisocyanate cross linking agent and (3) a metal catalyst complex. The metal catalyst complex is, in turn, comprised of a metal catalyst and a complexing sulfonic acid - in certain prescribed ratios. This reference also teaches that this formulation can be cured (chemically reacted) by introducing an amine catalyst into said formulation. That is to say that the amine catalyzes a curing reaction of the other three ingredients.

Examples I, II and III are given to show various ways of carrying out the above-noted reaction of the three ingredient formulations through use of a very specific amine catalyst. In these reactions Rubinate 9272 MDI (modified diphenylmethane diisocyanate) is used as item (2) of the Carlson formulation, i.e., it serves as the polyisocyanate cross linking agent of such a formulation. In other words, the Rubinate 9272 MDI is one of the three agents (and one catalyst) needed to produce the cured end product adhesive material.

Next, it should be noted that nothing is said about the hardness of the Rubinate 9272 MDI ingredient. Likewise, nothing is said about the hardness of Carlson's cured formulation either. Perforce, nothing is said or even remotely suggested about Rubinate 9272 MDI hardness values of Shore A20 to Shore A95.

This circumstance puts the Examiner in the position of asserting that Carlson's (1) polyol, (2) polyisocyanate cross linking agent, (3) metal catalyst complex and (4) amine catalyzed formulation will inherently have the Shore A20 to Shore A95 hardness value of Applicant's adhesive material.

This all goes to say that Applicant's adhesive is patently different from Carlson's adhesive i.e., it is not the same as the Carlson adhesive as asserted by the Examiner. Hence, nothing of record supports the Examiner's conclusion. Likewise, nothing of record renders Applicant's Shore A20 to Shore A95 claim limitation "obvious" under 35 U.S.C. § 103 concepts given the non-applicable teachings of the Carlson reference.

13. Re: Claims 9-11, 13 and 14

Since claims 9-11 13 and 14 depend from claim 1, Applicant invokes all of the above arguments concerning the nature of Applicant's adhesives regardless of the nature of the beads - be they hollow (claim 9), ceramic (claim 10), glass (claim 11) provided with holes (claim 13) or made of a thermosetting material.

14. Re: Claim 21

Here again, since claim 21 depends from claim 1, Applicant invokes all of the above arguments concerning the nature of Applicant's adhesives. Be that as it may, Applicant finds it difficult to imagine how the material used by Brother (U.S. Patent No. 6,485,446) to "increase the rate of shear at the interface of each microsphere" falls under Applicant's term "coupling agent." In the present context, the term "coupling agent" is generally taken to mean a chemical substance capable of reacting with both a reinforcement material and a resin matrix of a composite material. Such agents are, for example, used to bond inorganic fillers or fibers to organic resins to form or promote a stronger bond at the interface.

Brother says the following about the purpose of his non-slippery, high friction producing materials:

"By coating the microspheres with non-slippery, high friction producing materials, the pads effectively exploit the rate dependent shear characteristics of the material to form a semi-liquid, conforming, energy absorbing masma. The rate of shear created by a high speed impact is substantially increased as each of the individual microspheres attempts to roll over another microsphere. Since the action of rolling over each other multiplies the applied force of shear, the resulting rate of shear at the interface of each microsphere continues to increase. This increases the inherent rate of shear to the point wherein the semi-liquid nature of the material increases its viscosity and rapidly approaches the semi-solid or solid state. The resulting solid, lightweight pad absorbs much more kinetic energy than it would in a semi-liquid state when pressure is applied in a slow, even manner. For example, the viscosity of the masma of the invention increases closer to a non-liquid, nonmovable mass as the rate of shear increases. This effect is pronounced with the high rate of shear associated with high impact blows." (emphasis added)

Thus, the holding together (coupling) of adjacent microspheres aspect of Applicant's invention seems to be somewhat at odds with Brother's concept of rolling such microspheres over each other. The term "coupling agent" has a generally accepted and widely used

meaning. One would think that if Brothers thought that his composition was a coupling agent he would have said so.

15. Re: Claims 1-8, 12, 15-20 and 22-33

With respect to these claims, the Examiner asserts that the teachings of Nickerson et al. (U.S. Patent No. 6,301,722) in view of Carlson et al. (U.S. Patent No. 5,849,864) and the DVD disc "Lectro Engineering Company, MTM Systems" are such that the amount of adhesive patent application was inherently present in the Nickerson material even though Nickerson does not teach any specific amounts of his adhesive ingredient. The Examiner asserts that this adhesive amount can be inferred from knowledge of a composite material's bead size and its porosity. The Examiner states: "Since the porosity is essentially regulated by the bead size and the amount of the adhesive being used to held the beads together." Given this statement, it would seem that the Examiner's position is that the amount of the adhesive would be inherently present within the claimed range so as to enable the composite material to have the porosity within the claimed range as the bead size falls within the claimed range.

As was the case in the paragraphs re: claims 1-8, 12, 13-20 and 22-33 (see pages 12 and 13) of this response, Applicant counters the above assertion by again taking issue with what import should be afforded to the Examiner's use of the word "essentially." It seems to Applicant that, if there are other factors in play besides bead size and amount of adhesive employed, then the Examiner's concept that: if one "knows" the bead size and porosity then one "knows" the amount of adhesive present in the composite material, is placed in issue.

As previously discussed by Applicant, if one views the concept of "porosity" in terms of the ability of a composite material to permit passage of air and/or water, then one can postulate that air and water might have more of an affinity for one kind of adhesive over another kind of adhesive. For example, air and/or water might have less of a surface attractive affinity for an adhesive having a hardness of Shore A20 to Shore A95 than the air and/or gas has for an adhesive having a hardness outside of Applicant's Shore hardness range.

In other words, the Applicant is respectfully asserting that the Examiner does not "know" the porosity of the Nickerson material. Applicant certainly concedes that bead size

and adhesive amount are factors that will influence the porosity of the subject composite materials, but they may well not be the only factors that might come into play when the concept of "porosity" is under consideration. The Examiner's use of the language "Since the porosity is essentially regulated by bead size and the amount of the adhesive being used ..." seems to concede that other factors might also be in play (emphasis added).

Next, Applicant would respectfully assert that the Examiner has not shown that the respective adhesive materials are necessarily identical adhesive materials. Hence they do not fall within the "identical chemical composition" called for in the In re Spada 15 USPQ 2d 1655 (1990) decision.

With respect to the Nickerson/Carlson based rejection the Examiner also states:

"Carlson teaches the polyurethane adhesive made from rubinate 9272, which is exactly the same adhesive used by Applicants. Therefore, it is not seen that the adhesive of Nickerson as modified by Carlson would have a hardness after curing outside the claimed range as the same adhesive material and the same amount of the adhesive are employed. This is in line with In re Spada, 15 USPQ 2d 1655 (1990) which holds that products of identical chemical composition can not have mutually exclusive properties." (emphasis added)

As previously discussed by Applicant, the Carlson adhesive is not "made from rubinate 9272" - it is made from (1) a polyol or polymercapto resin, (2) a polyisocyanate cross linking agent such as Rubinate 9272, a metal catalyst complex comprised of a metal catalyst and a complexing sulfonic acid - in certain prescribed ratios which are chemically reacted through use of an amine catalyst. In short, the two materials are most certainly not "exactly the same adhesive used by Applicants."

Next, Applicant would note that the Lectro Engineering Company, MTM Systems does not "show" a "powdered material" being surface treated with a plasma discharge. It shows relatively large pieces of shredded automobile tires being surface treated.

For reasons heretofore discussed, a foam plate of a Nickerson material as modified by Carlson and the DVD teachings would not be identical or nearly so to a foam plate of Applicant's composite material. As heretofore shown, Applicant's adhesive is decidedly different from Carlson's adhesive. Moreover, nothing of record even remotely suggests that the cured Carlson adhesive will have a hardness of Shore A20 - Shore A95.

Responsive to the remainder of paragraph 15 of the Office Action of November 8, 2005 Applicant would reiterate that the relevance of the Carlson reference is minimized, and

in Applicant's view negated, by the fact that it does not teach what the Examiner asserts - namely, that Carlson teaches use of an "identical" adhesive. Again, in point of fact, Carlson teaches use of an adhesive comprised of: (i) a polyol or polymercaptop resin, (ii) a polyisocyanate cross linking agent such as Rubinate 9272 and (iii) a metal catalyst complex comprised of a metal catalyst and a complexing sulfonic acid. These three ingredients are then chemically reacted with each other. Therefore, Applicant's Rubinate 9272 adhesive can not be identical to Carlson's adhesive.

Given the facts noted in the preceding two paragraphs, it seems, to Applicant at least, that the Examiner's request to:

"clearly state how the Examples of the present invention are commensurate in scope with the claims and how the comparative Examples are commensurate in scope with Nickerson/Carlson/DVD"

is anomalous - indeed, it may well also be accused of being illogical.

That is to say that Applicant respectfully asserts that "examples" are just that - examples. The examples speak for themselves; they say what they say; they illustrate a point - and not a domain. In the patent context, examples might be likened to a given point on a planar surface. Indeed, the expression "metes and bounds" is often used to describe the "scope" of a patent claim. In effect, the Examiner is asking the Applicant to compare a point to a planar surface. All Applicant can say is that his points (be they examples of the chemicals used [see pages 64 to 66 of the patent application] or the impact absorbing qualities of the end product materials [see pages 67 to 73 of the patent application]) serve to elucidate the meaning of words used in the patent claims in order to facilitate an understanding of the scope (metes and bounds) of the claim as a whole.

16. Re: Claims 9-11, 13 and 14

Here again Applicant would submit that even if the bead materials disclosed in the Giardello bead mixture are the same as the bead materials employed in Applicant's bead mixture, those beads - whatever they are made from - must also be held together by an adhesive that cures to a Shore A20 to Shore A95 hardness level to produce a composite material that has all the limitations of claim 1 of Applicant's patent application.

17. Re: Claim 21

Applicant invokes what was said with respect to the Brother reference (see pages 15 and 16 of this Response). For example, Applicant stated that he found it difficult to image how a material (Brother's) used to "increase the rate of shear at the interface of each microsphere" falls within the definition of a "coupling agent." Again, Brother never used the term "coupling agent" and Applicant would speculate that this was because the concepts of increasing the rate of shear of continuous microspheres is somewhat at odds with the concept of "coupling" or bonding adjacent microspheres.

Conclusions

If Applicant understands the general import of the latest Office Action correctly, the Examiner is, in effect, asserting that the subject matter covered by the claim limitations of the present patent application are inherent in the teachings of the references cited and/or are inherent in the composite materials that would be produced by the teachings of those references. The Examiner also asserts that Applicant's invention is an "obvious" (under 35 U.S.C. § 103) combination of the cited references. In the alternative, the Examiner appears to be asserting that there is some sort of probability or possibility that these teachings (or materials) are "the same."

The Examiner began by contending that since the '506 patent to Kasahara teaches a bead/adhesive/void space system having beads of 2-20 mm average diameter and the presence of an adhesive in a weight percentage that at least partially falls within Applicant's 20-80 wt. percentage that system must therefore "inherently" have, "obviously" have, or "probably" have the other claim limitations e.g., (1) an adhesive component that comprises 20-80 weight percent of the final bead/adhesive/void volume product and (2) at least 50 percent of the beads at least 50 percent covered by the adhesive. The latest Office Action also heavily invokes the Carlson patent (U.S. Patent No. 5,849,864) to address the fact that no reference of record teaches an adhesive having a hardness of Shore A20 to Shore A95.

Here again, the Examiner, in effect, very heavily relies on certain "inherency" concepts and/or legal doctrines. In response, Applicant respectfully submits that the Examiner's assertions are either not true or not valid at all, or are not necessarily true nor valid. (Applicant has, and will continue to, underline the word "necessarily" because this word plays

a very important part in certain M.P.E.P. standards that will be hereinafter more fully discussed.) Applicant will begin by asserting that just because the Kasahara patent teaches: (1) use of beads having 2-20 mm diameters and (2) the presence of an undisclosed amount of adhesive in the final product, these factors do not necessarily imply that the final product of the '054 patent must necessarily be comprised of, say, the 20-80 weight percent adhesive requirement, or the 50% surface coverage requirement called for in the present '965 patent application.

Applicant again asks the Examiner to consider the idea to the effect that a final product of the Kasahara patent might just as well have been comprised of say only 5 weight percent adhesive while still employing beads having Applicant's 1-10 mm diameters and producing a final product having Applicant's 10-40 percent void volume. It would appear that Applicant's 5 weight percent adhesive assumption is just as valid as the Examiner's 20-80 weight percent assumption because the '054 patent teaches absolutely nothing about the amounts of adhesives that may be employed in its products. In other words, Applicant is respectfully suggesting the presence of 20-80 wt. % adhesive in the Kasahara patent teachings is an assumption, or an entertainment of a possibility, on the part of the Examiner. Applicant is also of the opinion that just because the Kasahara patent teaches bead diameters 2-20 mm partially falling within Applicant's 1-10 mm range and the presence of adhesives in unknown quantities, these factors in no way teach or suggest that at least 50% of the beads in the final product will be at least 50% covered with that adhesive. Here again, if the final product of the Kasahara patent contained only the above postulated 5% adhesive, then there might not be enough adhesive to cover at least 50% of the beads with at least 50% adhesive.

This all goes to say that even assuming for the sake of argument that the Kasahara patent may suggest "coating" the beads with an adhesive, this concession does not extend to some of the present application's other claim limitations (e.g., (1) 50% of beads being at least 50% covered by adhesive, (2) adhesive constituting 20-80 wt. % of the final product). In other words, Applicant is of the opinion that the Examiner's conclusions, to the effect that there must be 20-80 wt. percent adhesive present in the Kasahara patent's materials, that 50% of the beads are at least 50% covered, etc. seem to be based upon an "overstretched" assumption and/or conclusion on the part of the Examiner regarding the amount of adhesive in the final product.

And, above all, the fact that the Kasahara patent beads may be (or may not be) at least 50% covered with an adhesive says absolutely nothing about the hardness of that adhesive. In other words, the Examiner is again asked to more fully consider that the present patent application emphasizes the importance of the hardness of the cured adhesive (i.e., Shore Hardness levels of A-20 to A-95) in all of its final product materials. Applicant would also again ask the Examiner to note that the hardness of the cured adhesive is also conjunctively associated with several other attributes of the cured adhesive (e.g., 20-80 wt. % or 2-5 vol. % etc.). For example, these points are covered in the first paragraph of page 67 of the present patent Applicant. Again, this paragraph reads as follows:

"Applicant's experimental findings have established that, when used in the hereindescribed proportions (20-80 wt. % or 2-5 vol. %), certain adhesives (those having hardness levels ranging from about Shore A 20 to Shore A 95) play an important part in the ability of the hereindisclosed bead/adhesive/void space padding materials to repeatedly absorb high levels of impact energy. This finding was primarily established through use of various impact tests. For example, in one series of such impact tests (so-called Acceleration Peak (G) tests) whose results are shown below as Test 1 below, Applicant kept the percent of adhesive constant at 2 volume percent and varied the "hardness" of the adhesive. This variation in hardness was accomplished by increasing the number of chemically active sites of the adhesives by adding varying amounts of a second chemically active component to a base resin system. For example in polyurethane formulations, the relative amount of N=C=O component of the adhesive was varied relative to a NH-C-NH component of said adhesive. Such tests indicated that as the hardness of the adhesive material used to create the subject bead/adhesive/void space materials of this patent disclosure was increased, the material's impact absorptive ability increased as well.. These tests also indicated that the adhesive itself (and not just the beads) contributes greatly to the impact absorption qualities of Applicant's padding materials."

The above quoted language, and the underlying data further supporting that language, clearly show that, under the teachings of the present invention, the same general type of adhesive material, e.g., polyurethane, can have different Shore hardness values according to how that adhesive's original ingredients were formulated. In other words, the above language teaches that some polyurethane adhesives can cure to hardness values falling within Applicant's Shore A-20 to Shore A-95 range - while others need not. By way of example, the present patent application clearly shows that two urethane-based adhesives can have different hardness levels. It also bears repeating here that the concepts of viscosity of the "wet" formulation and the hardness of the cured adhesive are in no way correlated by the

Applicant. This is the Examiner's unsupported assertion. Moreover, Applicant has clearly demonstrated that these different hardness levels can be used to achieve different results from those considered by the prior art (i.e., the ability of Applicant's materials to repeatedly absorb high levels of impact energy) according to whether or not such urethane-based adhesives were specifically formulated to have cured adhesive hardness values ranging between Shore A-20 and Shore A-95.

Thus, it seems to Applicant that, even though the Office Action does not specifically say so, the Examiner's rationale for "inherency" appears to be based upon a conclusion (or assumption) that the adhesives described in both the '054 patent and the present patent application have (or may have) a urethane component - and therefore must be "the same" in every respect. Again, Applicant's response to any such assertion is: even if it were assumed for the sake of argument that both adhesives do in fact contain urethane, this circumstance would not, under the teachings of the present invention, necessarily mean that both urethane-based adhesives will necessarily have the same hardness levels. Indeed, the above-quoted language clearly teaches just the opposite, i.e., it teaches that different urethane-based adhesives can have different hardness levels depending on the ratio of the urethane-based adhesives' N=C=O/NH-C-NH ingredients. Moreover, Applicant again notes that Applicant's adhesives can be materials other than urethane-based materials - so long as they have cured hardness values of Shore A-20 to Shore A-95.

In the latest Office Action, the Examiner sought to overcome the import of the above paragraph by finding a reference (Carlson) that purports to teach the use of Rubinate 9272 as an "identical" adhesive to Applicant's. In point of fact, the Carlson reference does not teach the use of Rubinate 9272 as an adhesive. Instead, it teaches an adhesive comprised of: (1) a polyol or polymercaptop resin, (2) a polyisocyanate cross linking agent such as Rubinate 9272 and (3) a metal catalyst complex comprised of a metal catalyst and a complexing sulfonic acid employed in certain prescribed ratios. Such formulations are then chemically reacted ("cured") by introducing an amine catalyst into the above formulation to produce an adhesive. Hence, Applicant, most strongly, insists that Carlson's adhesive is not the same as, indeed "identical" to, Applicant's adhesive as asserted by the Examiner. Hence, the Examiner's "inherency" argument must fall in the face of the above noted chemical facts.

Next, the Examiner is asked to consider that Applicant's discovery of the importance of the hardness of the cured adhesive with respect to the impact absorption qualities of the final product material was established by the experimental work described in Tables 1 and 2 of the present patent application. Moreover, Applicant would further submit that since none of the references teach anything whatsoever about the adhesive hardness levels in such compositions, this fact alone is evidence that Applicant's findings with respect to the adhesive hardness/impact absorption should be regarded as an "unobvious difference" between Applicant's present materials and any of the urethane-containing end product materials covered by the cited references. Applicant recognized this point at page 74, lines 1-9 of the '965 patent application with the following comments:

"It is counterintuitive that a harder, and presumably more brittle, adhesive material would be a better impact absorbing material than a softer, more elastic adhesive. Nonetheless, this is the case in Applicant's bead/adhesive/void space padding materials. Applicant has made many tests such as Tests 1 and 2 and have concluded that some form of micro-fracturing of the adhesive, and perhaps even certain kinds of beads, takes place during impact and that this microfracturing can greatly contribute toward the impact absorbing quality of these padding materials."

Stated another way, Applicant respectfully asserts that the "inherency" argument raised in the Office Action completely ignores, or sidesteps, or seriously downgrades one of the most important aspects of the overall inventive concept of the present invention - namely, the specific requirement for a Shore A-20 to Shore A-95 hardness in the cured form of Applicant's adhesives.

It should also be emphasized once again that, under the broader teachings of the present invention, adhesives employing active ingredients other than urethane (see page 64, line 22 to page 65, line 11 of the current '965 patent application) also can be formulated to produce adhesives having Applicant's required Shore Hardness values in the A-20 to A-95 range.

Legal Considerations

From the legal perspective, it would also appear that the Examiner's "inherency" argument is based in large part upon an assumption (and/or upon a conclusion) that the materials described in the present patent application are "the same" as a combination of

those described in the Kasahara patent and in the Carlson patent. In the alternative, the Examiner may be arguing that these materials are (or "probably" are) "the same" because Rubinate 9272 was somehow used in both materials. That is to say that the Examiner seems to be arguing either of these positions on the grounds that, since both adhesives used Rubinate 9272, they must have the same attributes (including the same hardness levels). In response, Applicant would reiterate that he has clearly shown that even "the same" urethanes can produce adhesives having different hardness levels according to their relative N=C=O to NH-C-NH proportions. Moreover, pages 64-66 of the present patent application contain a host of different possible chemicals that can be used to make Applicant's adhesives. Once again, the thing that they must have in common however is a cured form having a hardness level of Shore A20 - Shore A95. In other words, Applicant is respectfully pointing out that even if the Carlson reference did teach the use of Rubinate 9272 as an adhesive - which it does not - this would only be one of many, many possible adhesive materials, provided of course that they had Applicant's prescribed Shore hardness levels.

A fair reading of Sections 2112 to 2112.02 of the M.P.E.P. would seem to indicate that the Examiner's "inherency" rejections are inappropriate in this particular case. Stated another way, Applicant respectfully asserts that the Examiner has failed to establish that the allegedly "inherent" characteristics necessarily flow from the teachings of that prior art. Again, Applicant is of the opinion that such assumptions or conclusions are invalid because they ignore, sidestep and/or very seriously downgrade Applicant's experimental data. Moreover, the Examiner's line of reasoning regarding the "sameness" of the materials described in the Carlson reference might also be accused of using "probabilities or possibilities" (as opposed to "necessities") to make the subject inherency arguments. The Examiner's attention is especially directed to the language contained in the following quotation from 2112(IV) of the M.P.E.P.

"The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 582-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.

Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." ...

In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." (emphasis, starting with the underlined word "necessarily," added)

Given that Applicant has repeatedly shown that the prior art composite materials are not the same as those described in the prior art reference, it would appear that the Examiner's inherency assertions are in serious conflict with the above-quoted M.P.E.P. passage. In Applicant's opinion, this conflict with the M.P.E.P. follows in large degree from the fact that the Examiner's core assumption (i.e., that all urethane-based adhesives must be inherently "the same" in every aspect) is erroneous - if for no other reason than the fact that such an assumption directly contradicts Applicant's experimental data. Moreover, the Examiner is again reminded that the claims are comprised of at least seven conjunctively joined elements that should all be given due consideration - in their conjunctive use as well as in their separate use.

Therefore, Applicant respectfully requests that the claims be allowed.

And as a final note, Applicant would also like to take this opportunity to thank the Examiner for her very considerable work on, and determined close attention to, this patent application during the past several rounds of its prosecution.

Should the Examiner have any questions regarding the above, please feel free to give the below-listed attorney a call. If additional fees are required, please debit our Deposit Account No. 04-1414.

Respectfully submitted,

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